Sources Sought – High Reliability Wireless Communications System

NOTICE
Solicitation Number:
Notice Type: Sources Sought

Synopsis:

**1.1. Title**
Sources Sought – High Reliability Wireless Communications System

**1.2. Background Information:**
The US Department of Energy (DOE) National Nuclear Security Administration (NNSA) is responsible for the nation's nuclear weapons production and stewardship. This Request for Information (RFI) is in support of NNSA responsibilities. NNSA is a semi-autonomous agency within the U.S. Department of Energy responsible for enhancing national security through the military application of nuclear science. The High Reliability Wireless Communications System will support this mission.

**1.3. Opportunity Description:**
This is a Request for Information (RFI) and Sources Sought notice issued by the Consolidated Nuclear Security, LLC (CNS), Prime Contractor to the U. S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) for a market survey of available High Reliability Wireless Data Communications systems. This RFI does not commit CNS to solicit or award an agreement as a result of any information obtained. The purpose of this notice is to solicit capabilities for a High Reliability Wireless Data Communications System. Interested parties shall submit a capability statement that provides sufficient detail that you can meet the requirements listed below in 1.6 Evaluation Criteria.

**1.4. Information Sought:**
Availability and technical capability of commercial products, including information regarding major components or complete systems, which will provide the ability to communicate broad-band data as identified in 1.6 Evaluation Criteria.

**1.5. Instructions to Respondents:**
Interested parties who consider themselves qualified to provide the listed systems are invited to submit a response to this Sources Sought Notice. Please submit comprehensive technical data sheets for each product proposed. The submissions should indicate how the product will meet section 1.6 Evaluation Criteria. Please submit availability for each product proposed. Submission of applicable white papers, application notes, and the product deployment history, are also encouraged. Responses will be evaluated based upon the criteria listed below. Mandatory requirements should be met, and scoring preference will be given to systems which meet all mandatory criteria and additionally meet one or more of the desired criteria.

**Responses must be received by November 18, 2016. Responses should be emailed to garret.scott@cns.doe.gov**

**1.6. Evaluation Criteria**
**1.6.1. Evaluation Criteria - Mandatory**

**Summary**
Sources are sought of suitable Commercial Off-the-Shelf (COTS) equipment, including major components or complete systems, which provide for wireless broad-band data transmission, with the required capability of multiple wireless communications paths. Communications paths shall automatically switch from one wireless link to another upon failure of a link to function, with minimal switchover latency. The wireless links should be diverse in nature, including both electromagnetic frequency and waveform. Waveforms employed should have anti-jam qualities. It is desirable for the system to also have Low Probability of Intercept and Low Probability of Detection (LPI/LPD) qualities and integrated Federal Information Processing Standard (FIPS) 140-2 encryption.

**Data Bandwidth**
System shall provide a minimum of 10 megabits per second (Mbps) of data throughput at all times.

**Data Interface**
The system shall allow interface and routing of standard Ethernet packets (IEEE-802.3) and Internet Protocol (IP) packets, including both IP versions 4 (RFC-791) and IP version 6 (RFC-2460).

**Electrical Interface**
The system shall be interfaced with standard IEEE 802.3 interface utilizing TIA-568 standard RJ-45 physical interface.

**Encryption and Authentication**
The system should have an integrated capability for full end-to-end transmission encryption meeting FIPS 140-2 Suite-B standards. The system should also encrypt configuration information data at rest. Encryption modules must be National Institute of Standards and Technology (NIST) validated.

**Environmental**
The system shall be capable of operating outdoors in all weather conditions, within a temperature range of -40C to 85C. Note that the system equipment may be installed in a weather resistant enclosure to meet these needs.

**Jam Resistance**
The system shall employ waveforms and techniques which reduce the susceptibility to jamming and denial of service. Example methodologies include spread-spectrum modulation techniques and adaptive detection and avoidance of jamming or degraded communications.

**Link Supervision**
The system shall be capable of performing periodic self-tests to ensure the communications links are functional. Test failures shall be reported via a form-c contact closure and/or SMTP messages. Link testing must occur no less than once every second.

**Self Test**
The system shall perform a self-test including integrity test of software and firmware.

**Spectral Utilization**
The system may utilize an electromagnetic frequency range from High Frequency Radio (30MHz or 10m wavelength) through visible light (400nm wavelength). However, it is highly desirable for the spectral emissions to be in frequency bands available to the Federal Government as identified by the Manual of Regulations and Procedures for Federal Radio Frequency management, Code of Federal Regulations (CFR) 47CFR300.1. Utilization of frequency bands as allowed under Annex K of 47CFR300.1 is acceptable.

**System Range**
System must have a minimum wireless range capability of 1,000m over open, unobstructed terrain.

**Transmission and Processing Latency**
End-to-end transmission Latency, including encryption and internal processing and routing, must be less than 100msec.

**Waveform and Spectral Diversity**
The system shall provide for more than one waveform or frequency band modality. Ideally, the system will incorporate dynamic waveform adaptation, dependent upon communications channel qualities. Waveforms and transmission methodologies may be standardized or proprietary. Examples of standardized waveforms include IEEE standard 802.11n/ac, and 3GPP E-UTRA, known as Long Term Evolution (LTE).

**1.6.2. Evaluation Criteria - Desired**

**Data Bandwidth**
System should provide a minimum of 100 megabits per second (Mbps) of data throughput at all times.

**Electrical Power**
The system should operate from Low-voltage unregulated DC power, such as 12VDC. Low Voltage is defined as less than 50VDC.

**Encryption and Authentication**
Integrated encryption to encrypt all transmitted data to FIPS 140-2 Suite-B standards, including all routing header and addressing information, is desired. Encryption modules must be NIST validated.

**Link Transition Latency**
A minimal wireless link transition latency, of less than 100msec is desired.

**Jam Resistance**
In addition to jam resistance, it is desirable for the system to also have Low Probability of Intercept and Low Probability of Detection (LPI/LPD) qualities and/or the ability to indicate an alarm upon detection of jamming or communication path degradation.

**Meshing**
It is desirable for the system to have the integrated ability to dynamically route, in an ad-hoc, multi-dimensional path structure, or mesh, redundant data paths between nodes.

**Spatial Transmissions**
Multiple Input, Multiple Output (MIMO), and Spatial Multiplexing transmission schemes are desirable where such methodologies improves throughput and Jam resistance.

**1.7. Primary Point of Contact**

**Contracting Office Address:**
PO Box 2009
Oak Ridge, TN 37830

**Place of Performance:**
Y-12 National Security Complex
Oak Ridge, TN
United States

**Primary Point of Contact:**
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**NAICS Code:**
334 –
334210 Wide area network communications equipment (e.g., bridges, gateways, routers) manufacturing
334210 Local area network (LAN) communications equipment (e.g., bridges, gateways, routers) manufacturing
334220 Communications equipment, mobile and microwave, manufacturing
334220 Microwave communications equipment manufacturing